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ABSTRACT

Based on the view that an administrative organization is composed of interacting individuals and that work flows through an interaction process, this paper attempts to develop a methodology that allows for the study of work flow patterns. It also applies this methodology to a particular educational organization in order to understand its peculiar inner workings. The work flow model was developed to estimate the number of steps an administrative system took to handle different types of work. Data were collected from 52 managers in the central office of a large school district by randomly sampling their work activities over a 6-week period. Findings suggest that much of the work carried out in educational organizations is never completed (such as curriculum reform, discipline policy, or union relations). It was found that the primary carriers and producers of this type of work are upper-level managers. A large proportion of their work was generated by other upper-level managers and probably will also be passed to upper-level managers. This holds for both routine and nonroutine work. These findings are interpreted to mean that upper-level managers spend much time discussing irresolvable issues while lower-level managers are more likely to complete the tasks they undertake. (Author/JM)

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A View of Work Flow in an Administrative System:

The Case of Routine and Non-Routine Work

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The research reported here was performed pursuant to Contract No. G-79-0044 of the National Institute of Education. It does not, however, necessarily reflect the views of that agency. An earlier version of this report was presented by Gail MacCall at the TIMS Meetings, May 7, 1980, Washington, D.C.

ABSTRACT

There are two primary objectives of this research. First, it is an attempt to develop a methodology for investigating processes within administrative organizations that allows for the study of work flow patterns. The second objective is to apply this methodology to the study of an educational organization in order to understand some of its peculiar inner workings. Specifically it is used to estimate the number of steps it takes the system to handle routine and non-routine work.

The data used in this study were collected by randomly sampling the work activities of 52 managers in one system over a six week period. An average of 570 observations were made of the work of each manager.

In general, the findings showed that there were substantial differences in the way upper level managers and lower level managers handled different types of tasks. The implications of the results for the overall operational efficiency of administrative systems of school districts are discussed.

The research reported here has two primary objectives. The first is to develop a methodology for studying the behavioral processes that link the actions of individuals within organizations in order to understand the functioning of administrative systems. The second objective is to apply this methodology to the study of an administrative system of an educational organization in order to understn-d some of the peculiarities of its inner workings. The approach is used specifically to estimate the number of steps it takes for the system to handle routine and non-routine work. In general, the results showed that there were substantial differences between the way upper level managers and lower level managers approached different types of tasks. The findings have implications for the overall operational efficiency of the system which is particularly important given the severe financial resource constraints faced by educational institutions.

Five sections of the paper follow. In the first section the view of organizational behavior on which this paper is premised is explained. The data requirements of this approach and their treatment are discussed next. In the third section some ideas about how routine and non-routine work flow through an administrative system are presented and in the next section the empirical findings related to these ideas are presented and discussed. In the concluding part of this paper the findings are considered in conjuction with some contextual data in order to draw implications for educational organizations.

A VIEW OF AN ADMINISTRATIVE SYSTEM

Administrative systems, and organizations in general, can be viewed in very different ways. The view taken in this paper is that an administrative organization is composed of individuals. These individuals interact and through this interaction process work flows in and around the system. Through studying the contingent character of the activities of individual participants we gain insight into the patterns of action of the organization.

This view is not new; it has a history in both the theoretical and descriptive organizational literature. Descriptive studies suggest that the most relevant immediate environment for managers is that created within the organization. Managerial time and attention is regulated, to a large extent, by the demands of others (Carlson, 1951; Guest, 1956; Mintzberg, 1973; Lawler, Porter and Tannenbaum, 1968; Burns, 1954; Neudstadt, 1960). And these "others," for the most part, are managers within the same organization (Burns, 1954; Stewart, 1967; Kelly, 1964; Thomason, 1966; 1967). The theoretical literature which takes a similar view is familiar (Simon, 1957; March and Simon, 1958; Cyert and March, 1963; Steinbruner, 1974; Weick, 1979). These theorists explain organizational processes, particularly decision making, by focussing on how individual attention and behavior is affected by various environmental stimuli, especially those transmitted by social communication channels within the organization. In general, the behavior of a manager and its effect on others are viewed as functions of the organizational situation in which the manager is placed (Simon, 1957).

Simple hierarchical models would lead us to expect that the dominant direction of interaction and the concomitant flow of work is from the top, down. Higher level persons direct and supervise the work of lower level persons. More recent theorizing suggests that the process is more ambiguous (Cohen, March and Olsen, 1972; Weick, 1979). The attention and energies of individuals are directed by many different stimuli and the direction of flow is hardly uni-directional. It involves bottom-up, lateral, and top-down processes that are complicated by feedback loops. These processes vary both by the characterisitics of the individuals and by the characteristics of the tasks.

The above view has a number of implications for how to go about understanding the inner workings of administrative systems. First, it directs us to focus on the behavior of individual participants. Using simple models that focus on aggregate measures, for example, levels in the hierarchy, will mask much that is of interest. Second, it suggests that we consider the set of stimuli to which managers react. In other words, it suggests that we study what other managers within the same organization are doing and how they impact on each other. Third, it suggests that we measure the behavior of individuals at the task level in order to capture critical determinants of behavior. And lastly, it suggests that we treat the data in such a way that we are able to uncover feedback loops as well as direct effects.

There are two possible ways to proceed, neither without limitations. One way is to follow specific tasks through the organization. Theoretically, this would be the more straightforward way to proceed. On a practical level, however, it would be more difficult. First, it would require following a very large number of tasks in order to discover variations in routes and deviations due to task characteristics. Second, there would be definitional problems.

When does a task begin; when does it end? Is it the same task if individuals define it differently? These practical problems far outweigh the nice theoretical simplicity of following tasks through the organization.

The second way to proceed is to take a series of cross-sectional pictures of the organization. Each time a picture is taken the behavior of individuals would be observed. The activities of individuals would be sampled and at each sampling descriptors of the task at hand and the immediate stimulus for the manager's behavior would be recorded. This method also has limitations, although they are different from those pointed out for the previous approach. The major problem is that we cannot determine the precise routing of tasks; we can only estimate it stochastically from the series of cross-sectional pictures. That is, we cannot say with certainty that person b received a task, say, from person a and passed that task on to person c. The data would tell us the probability that person b would receive a task from person a and the probability that person c would receive a task from person b.

Despite these limitations, this second method, if it is employed over an extended period of time, allows us to capture the interaction and work flow patterns among a full set of individuals in an organization and also to do this across different task situations. And while the data may not be ideal from a theoretical point of view, they do allow us to draw inferences about how work moves in an administrative system and to estimate the effects of task and sender characteristics. It is also clearly advantageous methodologically to the first approach in at least one way. The data are collected from all managers simultaneously which means that organizational level factors are, in effect, controlled. The natural way to collect data for the first approach, i.e., following tasks through the organization, is the observer technique. To gather data from all managers at the same time, using this approach would require a large number of observers in the organization. This would undoubtedly be

disruptive. An alternative would be to have fewer observers report on a few managers at a time. This would, however, greatly increase the total period over which data would be collected within the organization and thereby would also increase the chances of introducing uncontrollable exogeneous effects. In the section that follows, techniques that were actually used to collect data following the second approach and the data they generated are discussed.

THE DATA AND THEIR TREATMENT

In order to get a picture of managerial work flow, data were collected from nearly all the managers in an administrative system.[1] The final sample was composed of 52 managers in the central office of a large (enrollment 40,000) school district. All the managers were responsible for managing or administering some aspect of the operation of the school district; they differed by functional division[2] and hierarchic level.[3]

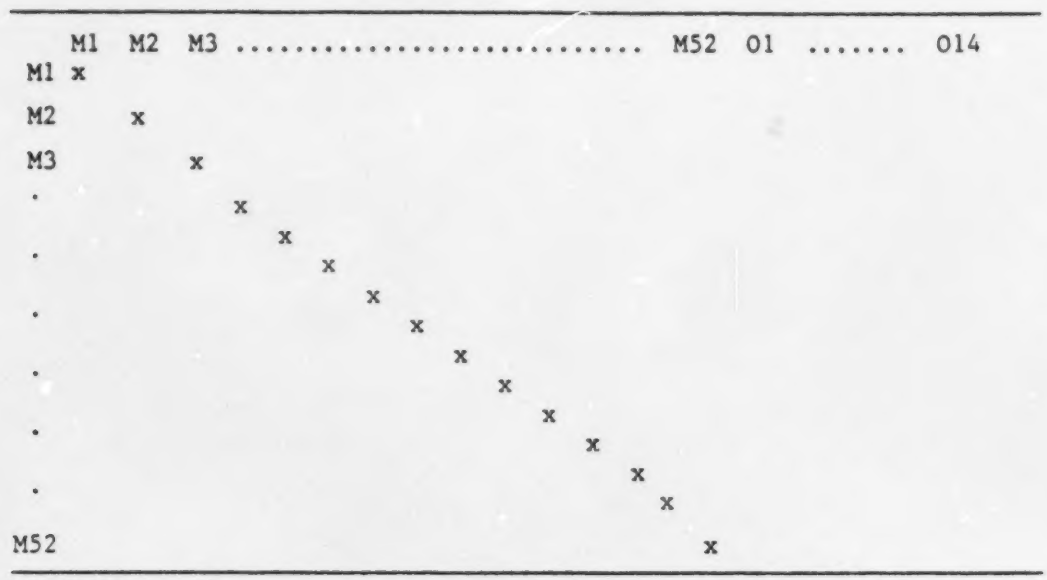
Data were collected from the managers over a six week period by randomly sampling their work activities. A random signal would beep, on average, once every fifteen minutes. At each signal, managers would punch into cards responses to ten questions that described the task in which they were engaged at that moment. (See Appendix B.) Managers reported the immediate initiator or stimulus for each task (at each observation). They would report the task as self-initiated or specify the individual, or class of individuals, e.g., school principals, who asked or in some way caused them to be doing whatever they were doing at the moment of the "beep." Respondents were instructed to report the immediate initiator in order that their responses not rely on memory or inferences of causes. While this means we cannot determine the ultimate initiator for any one task, it does allow us to estimate work flow patterns. Most interactions of interest are recurrent and earlier steps in a causal chain are captured in the data reported by other individuals. The list of initiators, which was obtained in a pre-data collection questionnaire, was individualized for each respondent. (See Appendix C.) Managers were asked to report those individuals with whom they interacted most. During the first few days of collecting the random observational data I talked with each manager to check the accuracy and appropriateness of the lists. In a few cases, a name was added or changed. Respondents also reported at each signal whether the task at hand was routine or non-routine. At each observation descriptors of the activity involved in

the task were also reported, e.g., reading, attending a meeting, talking on the telephone. They also reported whether they expected to complete each task alone or to pass it along to another person for purposes of conferral or referral. An average of 570 of these observations of work were collected on each manager.

From these observations the relative frequency that work passed from one individual to another can be calculated. These were then formatted into a 52 x 66 matrix where the 52 rows and first 52 columns represent the managers within the system and the other 14 columns represent individuals and groups who are outside the system, but who provide input into the system. Matrices showing workflow in this way can be developed for the full set of data as well for subsets of data, for example data on non-routine or on routine work. This permits the comparison of work flow patterns for different types of work.

The relative frequency matrices can then be used to construct a work flow model with stochastic properties. The model estimates the number of steps it takes for tasks to be resolved by tracing back from termination points to initiation points. The steps begin at any point where the task is self-initiated; it has no history before this. The diagram below shows the steps in a simple model for one person in a 3-person organization. The first branch in the model are the proportions of tasks that are completed by Person 1 that are self-initiated and initiated by each of the others in the organization. That is, c_{11} refers to the proportion of the tasks that Person 1 completed that were initiated by him/herself. This proportion represents the tasks that were completed in one step. c_{12} refers to the proportion of Person 1's tasks that s/he completed that were initiated by Person 2. c_{13} is defined in the same way. The branches after the first set refer to those tasks that had been passed to Person 1 from others

RELATIVE FREQUENCY WORK FLOW MATRIX

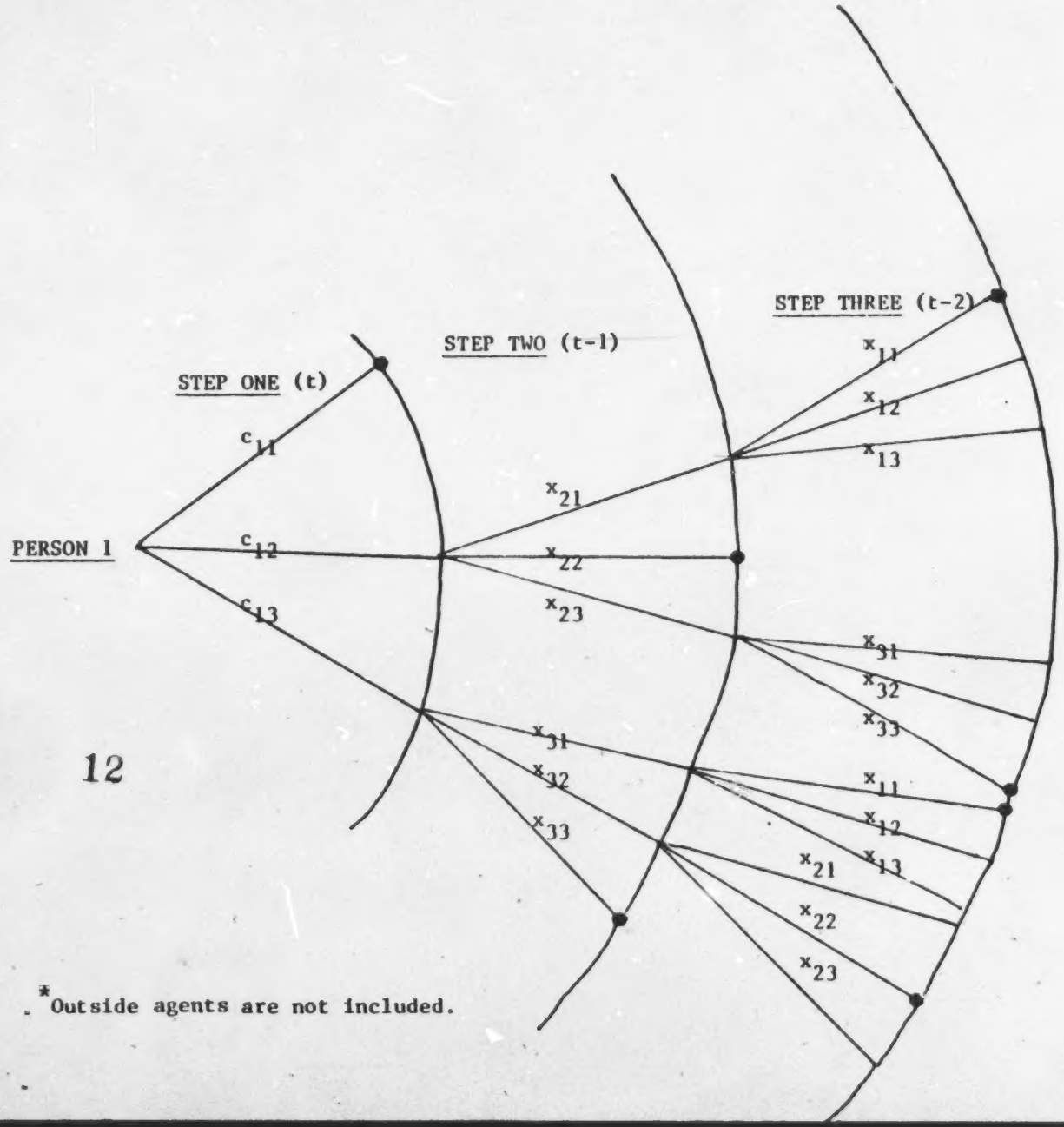


M1,.....M52: 52 Managers within the system.

O1,.....O14: 14 Outsiders who provide input into the system.

x: the relative frequency of self-initiated work.

SIMPLIFIED* WORK FLOW DIAGRAM- PERSON 1 IN 3-PERSON ORGANIZATION



$c_{11} = .3$
$c_{12} = .4$
$c_{13} = .3$

$x_{11} = .2$
$x_{12} = .3$
$x_{13} = .5$

$x_{21} = .4$
$x_{22} = .4$
$x_{23} = .2$

$x_{31} = .6$
$x_{32} = .3$
$x_{33} = .1$

*Outside agents are not included.

within the organization. For instance, x_{22} refers to the proportion of tasks that Person 2 initiated him/herself.

This would represent the beginning of one of the work flow chains and $c_{12} \cdot x_{22}$ would represent the proportion of those tasks completed by Person 1 that were completed in this two-step chain. x_{12} refers to the probability that Person 1 initiated Person 2's tasks, and so on. One can see from this how the model allows for feedback loops. The dots, o's, in the diagram show the beginnings of work flow chains.

Using hypothetical data, the diagram shows that 30% of the work terminating with Person 1 was completed in one step. That is, 30% of his/her work was both self-initiated and completed. An additional 19% was completed in two steps; and an additional 9% was completed in three steps. In other words, 58% of the work which terminated with Person 1 was completed in three steps.

When the actual calculations were done, the program proceeded to the step at which 95% of the completed work was explained or fifteen steps were completed, whichever came first. Also included in the calculations were the input of the 14 outsiders. (See Appendix D for details.) In the next section of this paper, we discuss how the number of steps for task completion may vary for routine and non-routine work.

THE FLOW OF ROUTINE AND NON-ROUTINE WORK

The routine and non-routine nature of tasks has been the subject of considerable speculation and research. According to some arguments we would expect the organization to deal with routine matters with fewer steps than with non-routine matters. But according to other arguments resolution would take place with fewer steps for non-routine matters.

Let me explain. Routine tasks are those tasks which managers have experienced and which are familiar to them. These tasks are expected by managers who most likely have established set responses to deal with them. Generally, we would expect that managers would know either how to handle these tasks alone or whom to refer these tasks to in order to have them resolved. Non-routine matters, on the other hand, are less likely to fall into established response sets, almost by definition. These matters are more likely to require search before resolution. The managers must look for an appropriate response and perhaps get clearance before action. This would lead us to expect routine matters to be dealt with in fewer steps than non-routine matters.

We might also look at routine and non-routine tasks in a different way. For example, we could argue that routine tasks are usually recurrent. The more they recur, the more managers would learn about different things that could "go wrong" and about additional factors that they should take into consideration. The usual response of an organization to this learning is to establish more checks or sop's to guard against such problems in the future. For example, the proliferation over time of organizational rules and regulations is well-documented. The other side of the coin holds for non-routine work. Because an organization has had less experience with non-routine matters, the range of acceptable responses is greater. Since

there is no strong precedent, or no "rule," telling the manager to go through certain procedures and, for example, pass the issue on to others for checks, it could very well be dealt with in fewer steps, even if the resolution is simply filing the matter.

We might also find differences in the length of the chain by the termination point. That is, we could argue that upper level managers are more likely to assume responsibility for non-routine matters and deal with them directly. Lower level managers, on the other hand, may be risk averse and therefore be less likely to attempt to complete a non-routine task alone. Alternatively, insecurity among managers who are at lower levels in the organization may lead them to bring quick, and perhaps premature, closure to an issue which they aren't sure how to handle. That is, lower level managers may be less inclined to be public about their ignorance or need for assistance in problem solving, while upper level managers would feel secure enough to involve others. By comparing the length of the chains that terminate with lower level and upper level managers we can explore such differences.

At this point one might reasonably ask why the criteria of efficiency does not determine the number of steps managerial systems take for task resolution. If it were "worthwhile" to have certain checks, i.e., if the benefits outweighed the costs, we would expect the organization to establish such procedures; and if the marginal costs were greater than the marginal benefits derived, we would not expect such procedures to be used.

The answer to this question lies in the nature of managerial work which is different in some important respects from other types of human behavior. Most human behavior can be explained in terms of its connection to some outcome; i.e., it is purposeful behavior. This explanation for behavior assumes that the outcomes of actions are knowable and perhaps even can be measured, and the relationship between some action and an outcome is stable or at least predictable. In the case of managerial work, however, these assumptions are problematic. First, it is difficult to define the output of any managerial action. How would one define the output of a telephone call, for example. Second, the environment is generally complex and dynamic so that the relationship between an action and some result can, at best be only imperfectly understood. Of course, if this were not the case there would be no need for managers. That is, if the means-end relationships were known and the environment were predictable, simple decision rules and incentive schemes could replace the work of managers. Managers are needed precisely because of the uncertain environment in which they work. But if their output defies precise definition and measurement, certain problems of management become evident. For example, there is no natural limit to managerial work. At what point is a task done? On what basis does a manager switch from one activity or task to another? Indeed, some might argue that because of this there can be no science of

management which prescribes appropriate behavior. In such a world, it is certainly not obvious how a cost-effectiveness analysis of different managerial actions could be conducted.

THE RESULTS

The work flow model, which was explained earlier, was developed to estimate the number of steps an administrative system took to handle different types of work. The actual calculations were tedious, but the results can be presented very simply. Table 1 below shows the average proportion of non-routine work that managers completed in one step as well as in two through five steps. Taple 2 shows the same results for routine work. In each table the results are reported for all managers and also for upper level and lower level managers separately.

Table 1. Mean Proportion of Non-Routine Work Completed by Step

Steps	All Managers N = 52	Upper Level Managers N = 19	Lower Level Managers N = 33
Step One	.37	.31	.41
Step Two	.46	.40	.49
Step Three	.47	.42	.49
Step Four	.47	.43	.50
Step Five	.47	.43	.50

TABLE 2. MEAN PROPORTION OF ROUTINE WORK COMPLETED BY STEP

Steps	All Managers	Upper Level Managers	Lower Level Managers
Step One	.51	.36	.60
Step Two	.59	.47	.66
Step Three	.60	.49	.66
Step Four	.60	.49	.66
Step Five	.60	.49	.66

Three general observations can be made about the results. First, there is a considerable amount of work in an organization that is never considered completed. Managers, on average, reported that they completed 37% of their non-routine work and 51% of their routine work in one step. After following the flow of work we find that the most work that ever ends up being reported as completed is, on average, 47% for non-routine work and 60% for routine work.* Many issues in the organization either float through the organization interminably or remain in a "pending" status. This should not be surprising. There are many basic issues particularly in educational organizations that never come to final resolution (Cohen, March and Olsen, 1972). For example, consider curriculum reform, discipline policy, and union relations. Most tasks associated with these areas simply redefine the problems or the surrounding circumstances without resolving the basic issues. The redefinitions then become input to the individual(s) in the organization who will deal with the next phase of the problem.

The second observation is that the system took more steps to handle non-routine than routine work; a significantly higher proportion of routine work was completed in one or two steps. This supports the common view that

*We only report to step 5 because any changes beyond this were negligible.

non-routine matters, by definition matters with uncertain consequences, generate search. These tasks pass from person to person in search of the best problem solver, or so the story goes. This argument would be supported more strongly, however, if the data showed significantly higher rates of task completion as the number of individuals involved in the work increased, i.e., as the work flow chain lenghened. Because the data do not show this and because the average proportion of non-routine work that ever comes to completion is low, one might argue somewhat differently: the search is not for the best problem solver, but for a manager willing to take responsibility for a non-routine matter, i.e., a matter where the acceptable response and the consequences for both the organization and the individual are unknown. The data suggest that many managers avoid this responsibility, but we are unable with these data to distinguish between the two arguments.

The differences between upper and lower level managers is the final general observation about the findings. Upper level managers are engaged in longer chains of work than lower level managers who complete more than a majority of their work in two steps. A majority of the work of upper level managers never seems to come to completion. This holds for both routine and non-routine work. There are three possible explanations for this. The first, which has been suggested earlier, is that lower level managers are less likely to involve others in task completion because of feelings of insecurity. They do not feel secure enough to admit, by asking for assistance, that they are not sure how to handle a situation. Upper level managers, however, being more secure by virtue of their position in the organization do not feel threatened by involving others.

A second explanation is that the nature of the work of the two sets of managers is different. Upper level managers, for example, may engage in a higher proportion of "important" work which requires coordination with others.

And third, the sources of work may differ for the two sets of managers and this may influence the response pattern on the part of managers. For example, requests for action that are initiated by individuals or groups outside the organization may be more likely to be handled in fewer steps than action requests from inside the system. Insiders have a definite advantage in terms of knowing what the organization is doing relative to outsiders. It is more likely that they can be "expert" in questions coming from the outside than when the request is from another insider. The above three explanations are probably not entirely independent. We can, however, begin to disentagle them by taking a closer look at the sources of work for different managers and some of the characteristics of the tasks they are asked to perform. These data will also help in drawing implications of the findings for educational organizations.

A Closer Look

We can get a clearer understanding of the effect of source, or the direction of work flow, by simply looking at the total proportion of the managers work that was initiated by others. Table 3 below shows the proportion of work that was initiated by other actors both inside and outside the system. This is done separately for upper level managers and for lower level managers.

TABLE 3 Proportion of Uper and Lower Managers Work Initiated by Others

	Self	Upper Level	Lower Level	Other Insiders	School Level	Parents/ Students	Commnty/ Advsry Bds	Federal/State Agents	Bd. of Education	Special Projects	Other Outsiders	Other	
Upper Level	28.3	28.2	10.8	1.2	7.7	1.1	.3	3.3	.2	.2	1.6	17.0	99.9
Lower Level	35.8	10.9	11.0	.3	22.6	1.6	3.3	2.7	—	.8	.4	10.2	100

The results here clearly show that the primary source of work for upper level managers is other upper level managers. They are the primary sources of control, if you will, of the attention and energies of each other. These managers control the work of lower level managers to less than half the extent. It is interesting to note that lower level managers direct the attention of upper level individuals to about the same degree as the upper level persons affect them. These findings are consistent with earlier findings that suggested that work that had begun within the system, i.e., as we can see here, work associated with upper level managers, was more likely to be involved in longer chains of work flow than work that came directly from the outside.

Table 4 below shows the probability that tasks received from different sources would result in managers' completing the task alone, passing it on or sharing it with others, or putting it in "hold." This is shown for upper and lower level managers for each source which accounted for at least 10% of the work of either set of managers. We are looking here for differences in a "source" effect. That is, are tasks received from different sources handled differently by managers?

TABLE 4. Disposition of Task by Source - Upper and Lower Level Managers

	Upper Level Managers N=19			Lower Level Managers N=33		
Source	Complete	Pass	Hold	Complete	Pass	Hold
Self	.59	.22	.19	.75	.12	.14
Upper Level	.44	.37	.20	.71	.17	.12
Lower Level	.36	.42	.23	.50	.28	.22
School Level	.39	.43	.18	.71	.12	.17

In general, we can see that upper level managers are more likely to pass work along to others, while lower level managers are more likely to complete tasks alone. The difference is most pronounced in response to requests from upper level managers and from school level personnel. Managers in upper levels are more than twice as likely as those in lower levels to pass a task received from another upper level manager. And lower level managers are almost twice as likely to complete a task received from school level personnel. Therefore, we can see from Table 3 and 4 together that not only are upper level managers the primary source of work for each other, but they are also a source that is highly likely in turn to generate work for others within the system.

In Tables 5, 6, and 7 we examine how the nature of the tasks received from various sources differs for lower and upper level managers. Table 4 shows the proportion of tasks from different sources that were considered routine and non-routine. Upper level managers, on average, spent 57% of their time engaged in routine work and 43% in non-routine work. For lower level managers the proportions were 70% and 30%, respectively.

The work of upper level managers, when it was self-initiated or received from other upper level personnel, was more likely to be of a non-routine nature than when lower level managers received task initiatives from the same sources. This suggests that task characteristics, as well as source, affects how managers handle their work. The picture that is emerging more clearly is that the longer work flows associated with the non-routine work of upper level managers is probably work that is bouncing around among those in the upper echelons of the organization and a large proportion of this will probably never be considered complete. The routine/non-routine differences between upper and lower level managers for work that originates with lower level and school level individuals is not great. In spite of this, however, we saw in Table 4 that upper level managers are far less likely to complete requests from these sources.

TABLE 5. Proportion of Routine and Non-Routine Work By Source

	Upper Level Managers N=19		Lower Level Managers N=33	
Source	Routine	Non-Routine	Routine	Non-Routine
Self	.58	.42	.79	.21
Upper Level	.54	.46	.63	.37
Lower Level	.69	.31	.64	.36
School Level	.69	.31	.73	.27

Another explanation for the longer work flow chains of upper level managers offered earlier is that these managers were involved in work that was more important and which therefore required involving others in the organization. Table 6 below shows the proportion of tasks that upper and lower level managers considered to be more important than average, an average level of importance, and less important than average. As can be seen, the ratings by upper and lower level managers are remarkably similar which does not offer support for this explanation.

TABLE 6. Importance Ratings By Level

	Upper Level N=19	Lower Level N=33
More Important	.25	.22
Average Importance	.61	.66
Less Important	.14	.13

Even when we look at the importance that upper and lower level managers attach to tasks received from various sources, there are not substantial differences. Table 7 shows the proportion of tasks received from each source that were rated at different levels of importance.

TABLE 7. Importance Ratings by Source and Level

	Upper Level Managers N=19			Lower Level Managers N=33		
Source	More Imp	Avg. Imp	Less Imp	More Imp	Avg Imp	Less Imp
Self	.13	.70	.17	.19	.72	.09
Upper Level	.35	.56	.09	.32	.62	.06
Lower Level	.25	.65	.10	.20	.67	.13
School Level	.23	.61	.16	.20	.72	.08

IMPLICATIONS OF FINDINGS FOR EDUCATIONAL ORGANIZATIONS

The findings showed that a significant part of the work that is carried out in educational organizations is never completed and that the primary carriers and producers of this type of work are upper level managers. A large proportion of their work is work that was generated by other upper level managers and will probably also be passed to upper level managers. These results suggest that much of their time is spent discussing among themselves irresolvable issues. Lower level managers, on the other hand, are more likely to complete the tasks they undertake and are also more likely to handle requests for action from outside the administrative system, e.g., from school level personnel.

The critical question with which we are left, and which is impossible to answer with these data, is the extent to which the collaborative, interactive, but in some ways very insular behavior patterns of upper level managers benefit the system. One of the reasons it is difficult to answer this question is that we are unable to distinguish whether collaboration is necessitated by the work itself or whether managers simply prefer to work this way for other reasons. For example, it is not unreasonable to assume that managers would want to work with each other because work which is social in nature is more pleasurable than work which is solitary. We can also imagine managers' preferring a collaborative work mode because they can thereby share the responsibility for their actions. This might expecially apply to non-routine work.

Educational institutions, however, are presently facing stringent financial conditions with no alleviation in sight. It is therefore questionable whether school districts can (or should) afford the luxury of highly paid administrators working in ways which have, at best, only a very indirect effect on the productivity of the school district as a whole. The findings of this paper would therefore suggest that when cuts are made that the primary targets should be those in administrative positions, particularly those at senior levels.

IMPLICATIONS OF RESEARCH METHODOLOGY

The research reported here was also an attempt to develop a new methodology for studying internal processes within organizations. The methodology proved to be useful for uncovering the workflow patterns within an administrative system and some of its determinants. The findings provide a static model of work flow. The real value of the method, however, should be in laying the foundation for studying internal processes in a dynamic fashion. That is, the present results set the initial conditions of work flow. By changing some of the parameters we can simulate changes through the model and estimate their effect. For instance, we could change the weights associated with the input of the outsiders. The impact of federal and state officials on local systems has been known, for example, to be highly variable and yet we do not have a very good understanding of how this affects the internal operation of the administrative system of school districts. Using a model similar to the one developed here could give us answers to such a question.

Another question that would be of interest to practicing managers as well as to organizational researchers is the effect of organizational structure on work flow. We could change the structure of our organization by increasing, for example, the ratio of upper level to lower level managers and examine how the direction of attention of managers might vary. Similarly, we could reduce the proportions of different types of managers and see how it affects different aspects of administrative operations. It may be that the addition of certain types of administrators increase, rather than decrease, the workload on the system.

These questions, of course, require some modifications to the simple model proposed here. One of the basic questions that would have to be addressed in any model which was concerned with change is how managers sort tasks. That is,

if we changed or increased the imput, and assumed that managers were fully employed, how would managers decide which tasks to attend to and which ones to let drop out of the system. One way to deal with this is to assume homogeneity of inputs, but this is a big assumption to make without some prior testing. One of the ways we can consider this assumption is by looking for sequence patterns in the tasks that managers reported. For example, what type of task followed a task which the manager reported putting in "hold." Looking for such patterns in the data could give us some indication of the priority systems of different managers.

It should be obvious that there are a number of questions that could be addressed using the approach developed here. Through studying the behavioral processes that link the actions of individuals throughout an organization, we can ask questions about administrative systems in a way that up to this point we have not been able to do. And perhaps through this way of studying organizations we can come to some new insights into how they actually work.

NOTES

1 Six administrators refused to participate; 3 positions were filled midway through the study and occupants were not included; and data from 16 managers were not included because they did not meet certain quality criteria. These criteria were mainly concerned with the responsiveness of managers to the random signals. (See Appendix A for details.)

2 The central office was divided into the following divisions: Superintendent's Office; Division of Instruction; Division of Personnel/ Planning; Business and Data Processing; Division of Guidance; Division of Adult/ Vocational Education.

3 Upper level managers include the Superintent, the Associate and Assistant Superintendents, Senior Specialists (e.g., for Labor Negotiations) who report directly to the Superintendent, and Program Directors (e.g., Director if Federal Programs). The upper level managers generally have supervisory authority over the lower level managers who carry out mainly liaison activities with the schools.

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APPENDIX A: CRITERIA FOR SAMPLE SELECTION

APPENDIX A: Criteria for Sample Selection

Quantity and quality measures were used to determine whose data to include in the study. A minimum of about two weeks of data per respondent was necessary. The quality measure was based on the number of "backfills" per card and the observations of the researcher. A card, on average, covered about a two-hour period. If a respondent punched responses only in the last column, the backfill column, it was interpreted as if the respondent were doing the same thing for the preceding, approximately two-hour period. This was convenient since there were a number of meetings, school visitations, conferences and workshops which lasted for extended periods. However, an excessive tendency to punch the last column leads to serious questions of data validity. Therefore, a minimum of 80% of respondent's data must be justified in order to be included in the study. Justified data are data that are punched according to the random signal, not in two-hour time periods. Two hour reports are considered justified only if they refer to meetings, conferences, or workshops.

Data on 52 subjects met the above criteria. The distribution according to length of participation is as follows:

Table A.1. Number of Respondents by Length of Participation

	Weeks of Data Collected					
	2 wks	2-3 wks	3-4 wks	4-5 wks	5-6 wks	Total
Managers	5	5	11	19	12	52

The only discernable pattern in terms of participation was in the Division of Guidance. Data on only 9 of the 21 administrators were included in the analysis. Four persons declined participation; 7 had insufficient data; and one person was hired after the study was underway. This can be explained partially by the office lay-out in the division. Most of the administrators were in one large office. Lack of cooperation was contagious. In addition, their jobs were the least amenable to the type of data collection used in this study; they spent more time in the field. The following table shows the number of administrators in each division and the corresponding number of participants.

Table A.2. Participation within Divisions

Division	Number of Managers	Number of Participants
Superintendent's Office	5	5
Division of Instruction	28	18
Division of Personnel/ Planning	6	6
Business and Data Processing	4	3
Division of Guidance	21	9
Division of Adult/ Vocational Education	12	10
Health Services	1	1
Total	77	52

APPENDIX B: DATA COLLECTION QUESTIONNAIRE

REPORT HEADINGS

Signature | Date | No. of Pages | Page No.

Project/Organization Name

Group/Department

Title

Participant Name

Time Period

Variable 1

Variable 2

Time Increment

Card Color

Low Card No.

High Card

CODE LIST

ACTIVITY Col. A

01	1 Meeting 1 to 1
02	2 Meeting 3 -4
03	3 Meeting 5+
04	4 Telephone
05	1+2 Write/Dictate/Punch
06	1+3 Think/Plan/Read/Study
07	1+4 Edit/Sign/Update
08	2+3 Sort/File/Retrieve
09	2+4 Waiting
10	3+4 Visitation
11	1+2+3 In-Service
12	1+2+4 Other

PROGRAM Col. B

	1 Regular School Program
	2 Special Educ Programs
	3 ECE
	4 A127/Title I
1+2	Adult/Vocational
1+3	Bilingual
1+4	Building Program
2+3	Other Categorical
2+4	Combination Catagorical
3+4	
1+2+3	
1+2+4	Other

ROUTINENESS OF TASK Col. C

1 Routine
2 Non-routine

CONTENT

01	5 Student Issues/Problm
02	6 Curriculum
03	7 Parent/Community Relts
04	8 Budget/Costs
05	9 Personnel Matters
06	5+6 Negotiation/ Mt &Conf
07	5+7 Proposal Dvlnt/FllwUp
08	5+8 Report Prep/Evaluatn
09	5+9 Bldg/Space/Supplies
10	6+7 Rule/Regultn Clarfctn
11	6+8 Personal
12	6+9 Other

INITIATOR

	5 Self
	6
	7
	8
	9
5+6	
5+7	
5+8	
5+9	
6+7	
6+8	
6+9	

FREQUENCY OF TASK OCCURRENCE

3 Often
4 Sometimes
5 Seldom/Never

IDEAL TASK PERFORMER

01	10 Self
02	11 Superior
03	12 Subordinate
04	10+11 Other Division
05	10+12 Secretary
06	11+12 Other
07	
08	
09	
10	
11	

Expected Disposition of Task

10	Implement/Complete alone
11	Hold for further info
12	Refer/Consult with other D.O. personnel
10+11	Refer/Report back to D.O. initiator

NOVELTY OF ISSUE

6 Common
7 Occasional
8 Unusual

IMPORTANCE OF ISSUE

9 Less
10 Same
11 More
12 Don't Know

APPENDIX C: PRE-DATA COLLECTION QUESTIONNAIRE

The following questions are part of a larger study on the work interaction patterns of central office school district administrators. The answers are to be used for background and cost purposes. They will also be used for coding the data collection devices which will be distributed October 27. The requested information is fairly routine and should only take a few minutes to complete.

Thank you in advance for your cooperation.

1. Name _____

2. Age
   a. less than 30 years _____
   b. 30 to 45 years . . _____
   c. 45 to 55 years . . _____
   d. more than 55 years _____

3. Position Title _____

4. Immediate Supervisor _____

5. Personnel Classification (Check one)

   a. certified _____
   b. classified _____

   If certified, type of credential:
   a. teaching..... _____
   b. counseling..... _____
   c. supervision..... _____
   d. administration.... _____
   e. other (specify) .. _____

6. Salary $_____

7. Salary Source: (if known)

	%
local	_____
state	_____
federal	_____
private	_____

8. Education:
   a. less than B.A./B.S. _____
   b. B.A./B.S. ..... _____
   c. M.A./M.S. ..... _____
   d. Ph.D./Ed.D. ..... _____
   e. Other (specify) ... _____

9. How many years have you been employed in the district? _____

10. Describe in a sentence or two your formal job responsibilities (e.g., Oversee district finances; Manage special education programs; Provide reading curriculum assistance to teachers).

_____

_____

_____

_____

_____

11. What % of your time (averaged over a week) do you spend in the following ways:

	% estimate
a. formal scheduled meetings with central office staff...	_____
b. unscheduled interactions with central office staff....	_____
c. personal/telephone contact with local school personnel (i.e. principals, teachers)	_____
d. contact with non-district employees	_____

12. List the persons (at the most 10) with whom you have the most work interaction. Consider individuals within and outside the central office and both superiors and subordinates. List in position #1 the person with whom you interact the most, and in position #2 the next highest, etc. (If there is a group with whom you interact frequently, e.g. principals, just list 'principals' as one person. If you list persons outside the school district, please give their institutional affiliation, e.g. state department of education.)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

13. Name the individual(s) you think has (have) the most influence over what you do during the day.

_____

_____

_____

PLEASE COMPLETE THE QUESTIONNAIRE AND SEND OR DELIVER IT TO SILVIA BY THE END OF DAY, MONDAY, OCTOBER 20.

APPENDIX D: STEP BY STEP CALCULATIONS

APPENDIX D: Step by Step Calculations

STEP ONE

$$A_i^1 = -c_{ii} + \sum c_{ik}$$

c = relative frequency matrix of tasks completed

ii = diagonals

k = columns 53...66

STEP TWO

$$A_i^2 = \sum_{\substack{j=1 \\ j \neq i}}^{52} c_{ij} \cdot B_j$$

x = relative frequency matrix of routine tasks

k = columns 53...66

where,

$$B_j = x_{jj} + \sum_k x_{jk}$$

STEP THREE

$$A_i^3 = \sum_{\substack{j=1 \\ j \neq i}}^{52} c_{ij} \cdot Dj$$

where,

$$D_j = \sum_{\substack{m=i \\ m \neq j}}^{52} x_{jm} \cdot B_m$$

STEP FOUR*

$$A_i^4 = \sum_{\substack{j=1 \\ j \neq i}}^{52} c_{ij} \cdot E_j$$

where,

$$E_j = \sum_{\substack{n=i \\ n \neq j}}^{52} x_{jn} \cdot D_n$$

---

* This would be repeated to the step where 95% of the work was explained.

A_i^s = proportion of tasks completed in s steps.